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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/261,329 03/03/99 ANDERSEN K 4887.204-US

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EXAMINER

SLOBODYANSKY, E

ART UNIT

PAPER NUMBER

1652
DATE MAILED:

10
09/06/00

**Please find below and/or attached an Office communication concerning this application r
proceeding.**

Commissioner of Patents and Trad marks

Office Action Summary

Application No.
09/261,329

Applicant(s)
Andersen et al.

Examiner
Elizabeth Slobodyansky

Group Art Unit
1652



☒ Responsive to communication(s) filed on Aug 12, 2000

☐ This action is **FINAL**.

☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11; 453 O.G. 213.

A shortened statutory period for response to this action is set to expire 3 month(s), or thirty days, whichever is longer, from the mailing date of this communication. Failure to respond within the period for response will cause the application to become abandoned. (35 U.S.C. § 133). Extensions of time may be obtained under the provisions of 37 CFR 1.136(a).

Disposition of Claims

☒ Claim(s) 1-36 is/are pending in the application.

Of the above, claim(s) 1-10 and 20-36 is/are withdrawn from consideration.

☐ Claim(s) _____ is/are allowed.

☒ Claim(s) 11-19 is/are rejected.

☐ Claim(s) _____ is/are objected to.

☐ Claims _____ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The drawing(s) filed on _____ is/are objected to by the Examiner.

☐ The proposed drawing correction, filed on _____ is ☐ approved ☐ disapproved.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

☒ Acknowledgement is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d).

☒ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been
☒ received.

☐ received in Application No. (Series Code/Serial Number) _____.

☐ received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

*Certified copies not received: _____

☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

☐ Notice of References Cited, PTO-892

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 4,5

☐ Interview Summary, PTO-413

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Notice of Informal Patent Application, PTO-152

--- SEE OFFICE ACTION ON THE FOLLOWING PAGES ---

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DETAILED ACTION

This application is a continuation of PCT/DK97/00393 published as WO 9812307 A1 on March 26, 1998.

The preliminary amendment filed August 12, 1999 amending the specification to insert references to SEQ ID NOs has been entered. The Sequences Listing and the computer readable form thereof filed August 12, 1999 have been entered.

Claims 1-36 are pending.

Election/Restriction

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-4, drawn to a cellulase variant, classified in class 435, subclass 209.
- II. Claims 5-10, drawn to a cellulase variant with modified cysteines and a method of reducing the thermostability, classified in class 435, subclass 440.
- III. Claims 11-19, drawn to a cellulase variant modified in the substrate binding cleft, classified in class 435, subclass 209.
- IV. Claims 20-22, drawn to a cellulase variant, classified in class 435, subclass 209.

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- V. Claim 23, drawn to a cellulase variant, classified in class 435, subclass 209.
- VI. Claim 24, drawn to a cellulase variant, classified in class 435, subclass 209.
- VII. Claim 25, drawn to a cellulase variant, classified in class 435, subclass 209.
- VIII. Claim 26, drawn to a *Humicola insolens* EGV variant, classified in class 435, subclass 209.
- IX. Claim 27, drawn to a *Thielavia terrestris* cellulase variant, classified in class 435, subclass 209.
- X. Claim 28, drawn to a *Thielavia terrestris* cellulase variant, classified in class 435, subclass 209.
- XI. Claim 29, drawn to a *Pseudomonas fluorescens* cellulase variant, classified in class 435, subclass 209.
- XII. Claim 30, drawn to a *Crinipellis scabellia* cellulase variant, classified in class 435, subclass 209.
- XIII. Claims 31-33, drawn to a method for improving the properties of a cellulolytic enzyme by using its three-dimensional structure, classified in class 435, subclass 440.

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XIV. Claim 34, drawn to a method of improving the specific activity of a cellulase, classified in class 435, subclass 440.

XV. Claim 35, drawn to a method of altering the pH activity profile of a cellulase, classified in class 435, subclass 440.

XVI. Claim 36, drawn to a method of altering the stability of a cellulase, classified in class 435, subclass 440.

The inventions are distinct, each from the other because of the following reasons:

Inventions I-XII are patentably distinct as directed to different variants of different enzymes. Methods of inventions XIII and XIV-XVI are patentably distinct because they are drawn to materially different methods requiring modifications of various enzymes at different positions and leading to changes in different properties. Furthermore, a method of invention XIII includes manipulations of an enzyme structure such as constructing a homology-built three-dimensional structure of an enzyme.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their divergent subject matter, fall into different statutory classes of invention, and are separately classified and searched, restriction for examination purposes as indicated is proper.

During a telephone conversation with Mr. Elias Lambiris on August 31, 2000 a provisional election was made with traverse to prosecute the invention of Group III,

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claims 11-19. Affirmation of this election must be made by applicant in replying to this Office action. Claims 1-10 and 20-36 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a petition under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claims 11-19 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a cellulase variant having endoglucanase activity, does not reasonably provide enablement for a cellulase variant with no

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endoglucanase activity. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

Factors to be in In re Wands 858 F.2d 731, 8 USPQ2nd 1400 (Fed. Cir. 1988). They include (1) the quantity of experimentation necessary, (2) the amount of direction or guidance presented, (3) the presence or absence of working examples, (4) the nature of the invention, (5) the state of the prior art, (6) the relative skill of those in the art, (7) considered in determining whether undue experimentation is required, are summarized the predictability or unpredictability of the art, and (8) the breadth of the claims.

Claims 11-19 encompass a cellulase variant with an endoglucanase activity and an inactive variant thereof. The specification does not teach how to use said inactive variant. Therefore, the breadth of these claims is much larger than the scope enabled by the specification.

The specification and the art disclose that residues recited in claims 11-19 are important in substrate binding. However, various combinations of these residues can lead to the loss of activity. The specification does not teach which combination of mutations will result in retaining of an endoglucanase activity. Therefore, one skilled in the art would require guidance beyond that provided in the specification as to how to

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use a variant with no endoglucanase activity. Without such guidance, the experimentation left to those skilled in the art is undue.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 11-19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 11, 12 and 17 recite distance "from the substrate". Without knowing the three-dimensional structure of the enzyme and the substrate in question it is impossible to define the recited position in the space.

Claims 13, 14, 18 and 19 recite the specific positions in an unspecified amino acid sequence referring to it as "cellulase numbering". Since "cellulase" encompass a great number of various enzymes with different amino acid sequences, the metes and bounds of the claims are not defined. With regard to claims 15 and 16 the conventional names of enzymes may change and vary and therefore, without the recitation of the specific amino acid sequences at which the recited positions are located, the claims are indefinite.

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Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless --

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 11-13, 15, 17 and 18 are rejected under 35 U.S.C. 102(b) as being anticipated by Lund et al.

Lund et al. (WO 96/17994, form PTO-1449) teach mutants of endoglucanase from *Humicola insolens* DSM 1800 (SEQ ID NO:1 in the instant specification) at positions 8, 55, 58, 62, 67, 132, 147, 162, 221, 222, 223 and 280 (abstract; claims 13 and 14). Positions 8 and 147 are recited in claims 13, 15 and 18. They are located within the substrate binding cleft. Therefore, claims 11-13, 15, 17 and 18 are anticipated by Lund et al.

Claims 11-19 are rejected under 35 U.S.C. 102(b) as being anticipated by Schulein et al.

Schulein et al. (WO 94/07998, form PTO-1449) teach the structure of the substrate binding cleft of endoglucanase from *Humicola insolens* DSM 1800 (pages 12-15, Table 1) and positions important for interaction with a substrate (page 22, line 6,

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through page 27, line 17; claims 26-36). These positions are recited in claims 13-16, 18 and 19. Therefore, claims 11-19 are anticipated by Schulein et al.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Davies et al.

Davies et al. (form PTO-1449) teach the three-dimensional structure of endoglucanase V from *Humicola insolens* (SEQ ID NO:1 in the instant specification). They teach the organization of the substrate binding cleft and the imported residues. They include residues at positions 8, 10, 20, 147 which are recited in claims 13-16, 18 and 19.


It would have been obvious to one of ordinary skill in the art at the time the invention was made to produce variants of endoglucanase V mutated at positions taught by Davies et al. in order to alter binding properties of the enzyme.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Elizabeth Slobodyansky whose telephone number is (703) 306-3222. The examiner can normally be reached Monday through Friday from 9:30 AM to 6:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dr. Ponnathapura Achutamurthy, can be reached at (703) 308-3804. The FAX phone number for Technology Center 1600 is (703) 308-4242.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Center receptionist whose telephone number is (703) 308-0196.


Elizabeth Slobodyansky, PhD
Primary Examiner

September 1, 2000